

Reciprocating Liquid Chillers

60-Hertz

These diagrams apply to 30HR,HS070-120 Model A units starting with Serial No. F155985 and ending with Serial No. G448588.

INDEX

UNIT 30HR,HS	FIGURE NUMBER	DESCRIPTION	VOLTS	UNIT LABEL DIAGRAM	
				30HR	Rev
070 thru 120	1	Wiring For Part-Winding Start	All	—	—
	2	Suggested Field Wiring Interlocks	All	All	Same As Below
070, 080, 090	3	Locations of Control Components	208,230, 460,575	080-1214 080-1224	A —
	4	Power Schematic			
	5	Control Circuit (Simplified Schematic)			
100, 110, 120	6	Control Circuit (Simplified Schematic)	208,230, 460,575	100-1584 100-1594	A —
	7	Power Schematic			
	8	Locations of Control Components			

GENERAL NOTES

1. Factory wiring is in accordance with the National Electrical Code. Any field modifications or additions must be in compliance with all applicable codes. Field-installed power wires must be rated 75 C minimum.
2. Control circuit is 115-1-60, with 10-amp circuit breaker.
3. Oil pressure safety switches are standard on 30HS units only. Jumpers between terminals **1** and **2** and between **3** and **4** are supplied on 30HR units.
4. Manual transfer switch provides the following starting sequences:
 Three-compressor units — position 1 (terminal A), 3-2-1; position 2 (terminal B), 1-2-3.
 Four-compressor units — position 1 (terminal A), 1-4-3-2; position 2 (terminal B), 3-2-1-4.
Stop unit before changing transfer switch position.
5. All field-supplied auxiliary contacts must have a minimum rating of 1250-va inrush and 430-va sealed plus capacity required for field-installed equipment between terminals **11** and **12**, **10** and **7**, **5** and **8**, **9** and **8**.
6. With accessory .75-kva control transformer, additional controls up to 3800-va inrush and 175-va sealed may be used.
7. When using a transformer, ground control circuit by connecting green wire from transformer terminal X2 to ground screw (detailed instructions with transformer package).
8. When using field-supplied 115-volt control power, terminal **24** (L2) must be connected to neutral or ground potential.
9. Across-the-line starting is standard on all units. If it is necessary to modify to part-winding start, refer to "Modification For Part-Winding Start."

SEQUENCE OF OPERATION

The 115-1-60 control power can be supplied directly from a separate source thru a code-approved fused disconnect or thru a field-installed accessory transformer with the primary side connected to the unit power terminal block. A double-pole circuit breaker protects the control circuit and serves as the control circuit switch. Crankcase heaters are wired in the control circuit ahead of the START switch, so they are always operative as long as the control circuit breaker is closed. Heaters are wired so they are on only when their respective compressors are cycled off.

WARNING: The control circuit power must never be off except when unit is being serviced.

After a prolonged shutdown of 8 hours or more, the crankcase heaters should be on for 24 hours before starting the unit.

When power is supplied to the control circuit and the control circuit breaker is closed, the unit is ready for operation, providing all safety devices are satisfied, interlocks are closed, and instructions on warning labels have been followed.

When the START button on the control panel is pressed, a red indicating light on the control panel comes on and the step controller and control relays 1 thru 4 are energized. After a maximum of 1.5 minutes, the recycle relay is energized and the step controller cycles back (in the load direction) to the correct cam position to begin the compressor starting sequence. The compressors start one at a time at brief intervals until the load requirement is satisfied. After completing the starting sequence, the controller stops and starts, unloads and loads the compressors to maintain capacity control in response to water temperature controller demand. Factory cam settings on the step controller protect the compressors against rapid recycling.

Complete Unit Stoppage can be caused by any of the following conditions: general power failure, blown fuse in control power feed disconnect, open control circuit breaker, STOP button depressed, open contacts in low water temperature cutout, open contacts in any auxiliary interlock between terminals [11] and [12].

Single-Circuit Stoppage can be caused by open contacts in any motor thermal protector, open contacts in low-pressure switch, open contacts in high-pressure switch, open contacts in oil safety switch (when used), blown compressor circuit fuse.

Stoppage of one circuit by safety device action does not affect the other circuit. Besides stopping compressors, all the devices listed *except the low-pressure switch* will close the liquid line solenoid valve for that circuit.

CAUTION: If unit or single circuit stops more than once as a result of any of the above safety devices, the cause should be determined and corrected before attempting another restart.

Restart Procedure (after cause for stoppage is corrected).

GENERAL POWER FAILURE — Press START button on control panel.

BLOWN FUSE IN POWER FEED DISCONNECT — Replace fuse and press START button on control panel.

LOW WATER TEMPERATURE CUTOUT — Press reset button on control (inside control box). Restart is automatic.

AUXILIARY INTERLOCK — Automatic restart after condition is corrected.

OPEN CONTROL CIRCUIT BREAKER — Close breaker and press START button on control panel.

HIGH-PRESSURE SWITCH — Press START button on control panel.

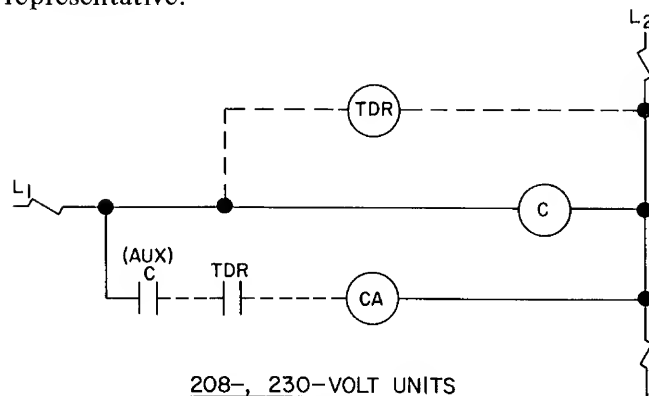
LOW-PRESSURE SWITCH — Compressors will restart automatically when pressure comes up sufficiently.

COMPRESSOR MOTOR THERMAL PROTECTOR — After motor has cooled down, press START button on control panel.

OIL SAFETY SWITCH — Press reset button on the switch, and press START button on control panel.

MODIFICATION FOR PART-WINDING START (See Fig. 1, 5 and 6.)

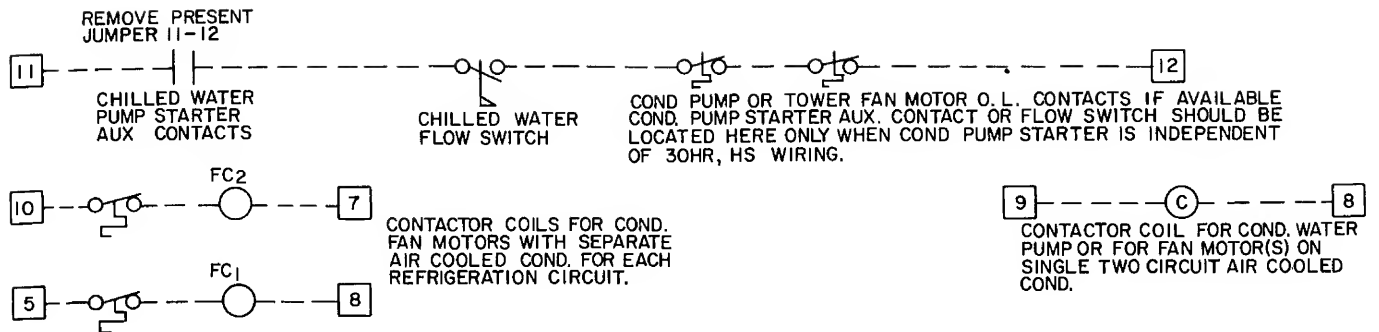
For 208-, 230-Volt Units — In the control circuit for each compressor, add a 1.5 second time-delay relay to actuate the second contactor coil (CA). Time-delay relay, Carrier part number HN67FK001, is available from Carrier Service Parts Center, Syracuse, N.Y. Contact your local Carrier representative.



LEGEND

AUX.	— Auxiliary Contacts	○	Holding Coil
C	— Compressor Contactor	—	Factory Wiring
CA	— Second Compressor Contactor	- - -	Field Wiring
TDR	— Time-Delay Relay		

Fig. 1 — Control Wiring for Part-Winding Start



(SEE NOTES 5 AND 6)

Fig. 2 — Suggested Field Wiring of Interlocks

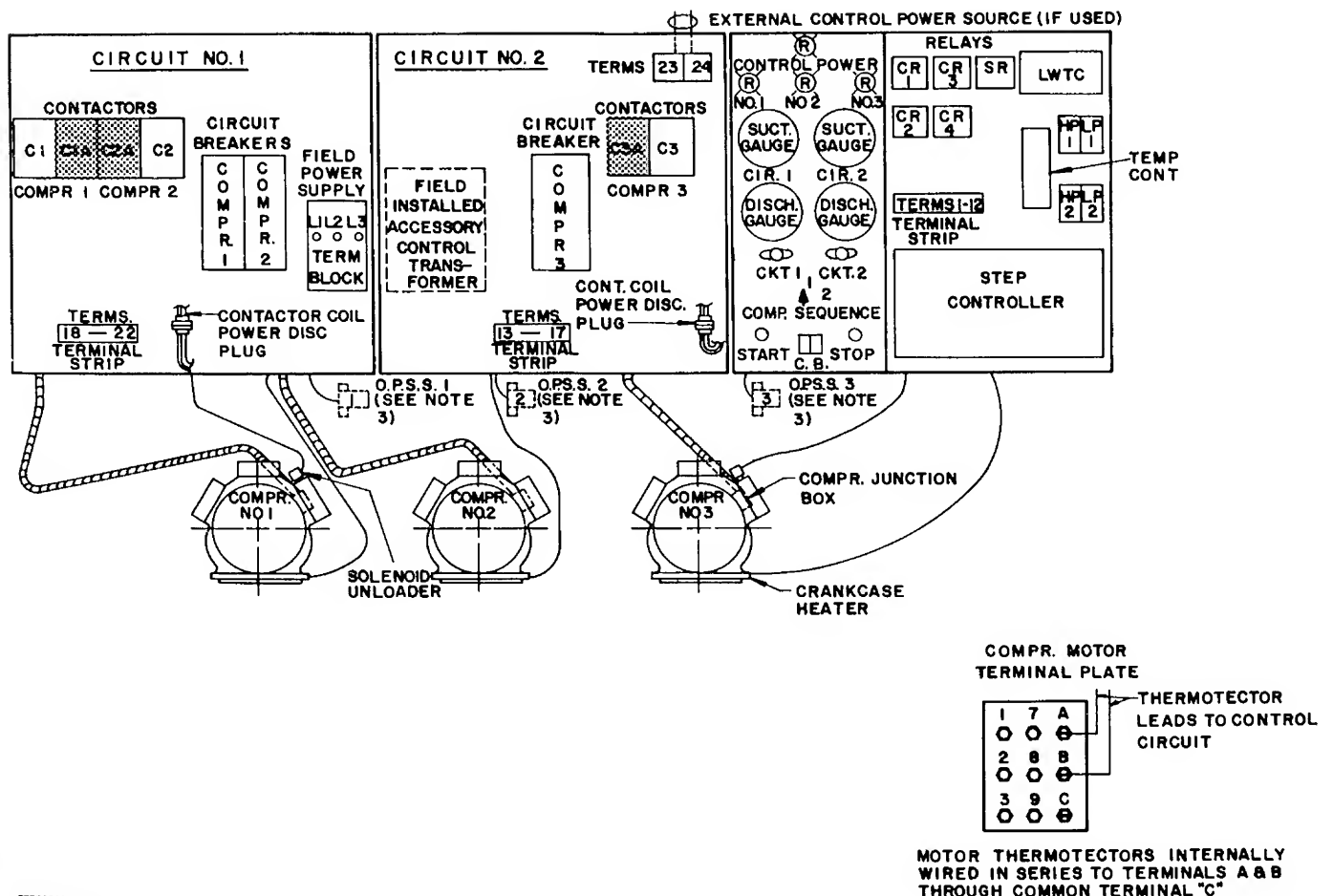
LEGEND (For Fig. 3 thru 8)

BR — Balancing Relay
C — Compr Contactor
CA — Second Contactor
CB — Control Circuit Breaker
CR — Control Relay
HP — High Pressurestat
LLS — Liquid Line Solenoid Valve
LP — Low Pressurestat
LS — Limit Switch
LWTC — Low Water Temp Cutout
OPSS — Oil Pressure Safety Switch
RR — Recycle Relay

S — Step Controller Switch
SR — Starting Relay
TS — Transfer Switch (Compr Starting Sequence)
U — Unloader (Compr)
XL — Across-the-Line

○ Coil
⊗ Light (Red)
◇ Terminals on Step Controller

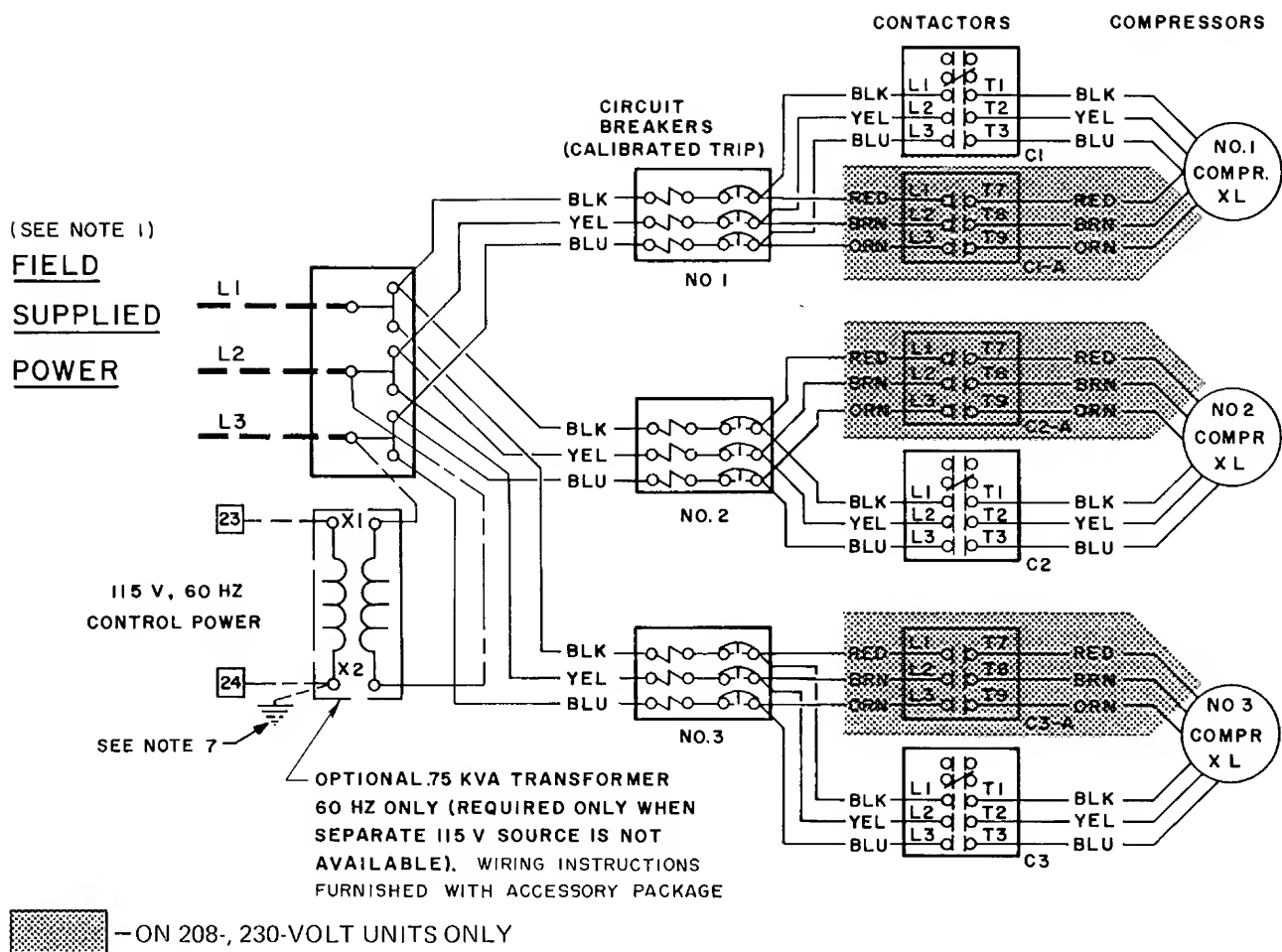
△ Terminals on Temp Controller
□ Terminals on Terminal Strips
⬡ Terminals on Compr
— Factory Wiring
- - - Factory Wiring on 30HS Units Only
- - - - Field Wiring
- - - - - Factory Wired, Field Connected



ON 208-, 230-VOLT UNITS ONLY

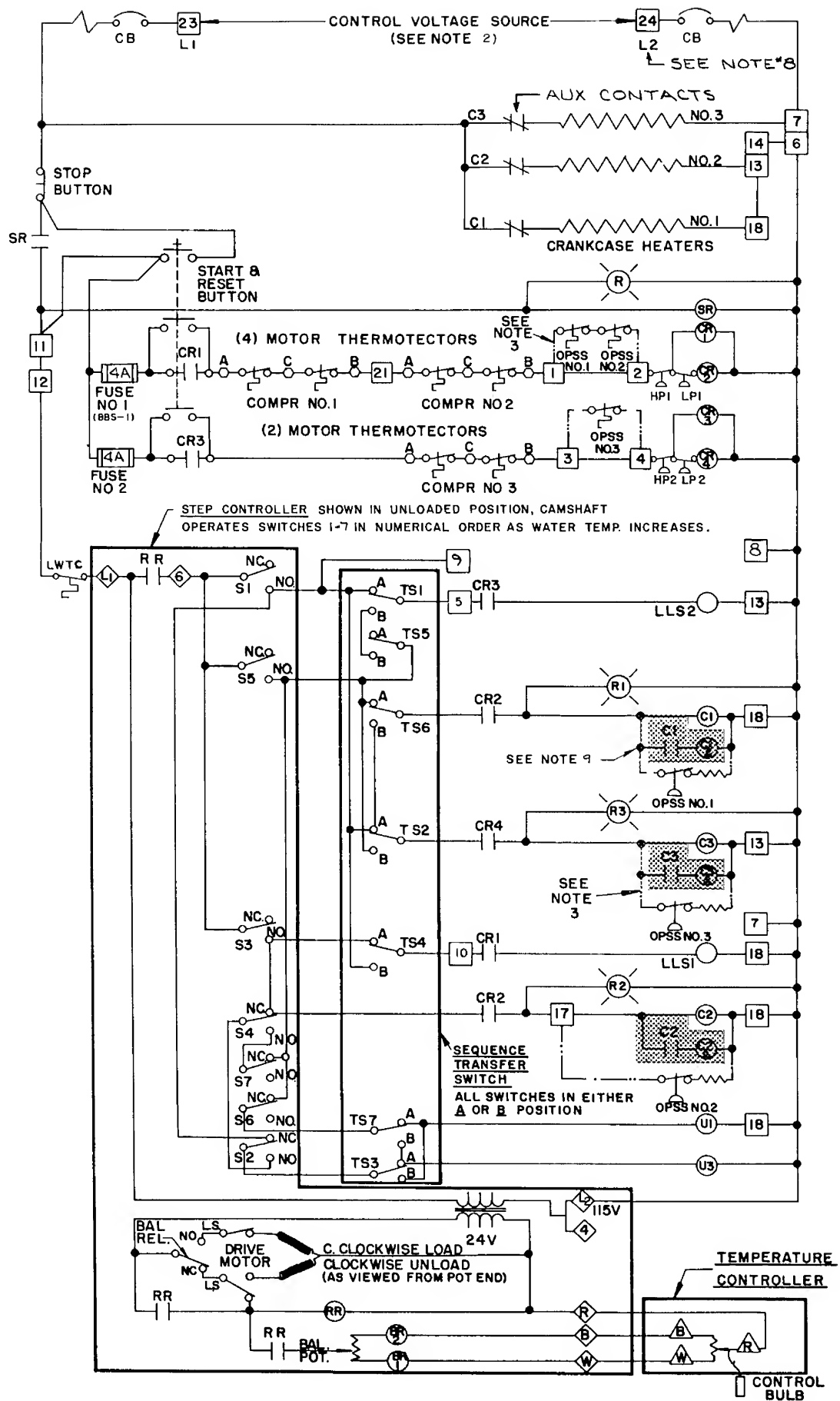
30HR, HS070, 080, 090

Fig. 3 — Locations of Control Components (All Voltages)



30HR, HS070, 080, 090

Fig. 4 — Power Schematic (All Voltages)



— ON 208-, 230-VOLT UNITS ONLY

30HR, HS070, 080, 090

Fig. 5 — Control Circuit Schematic (All Voltages)

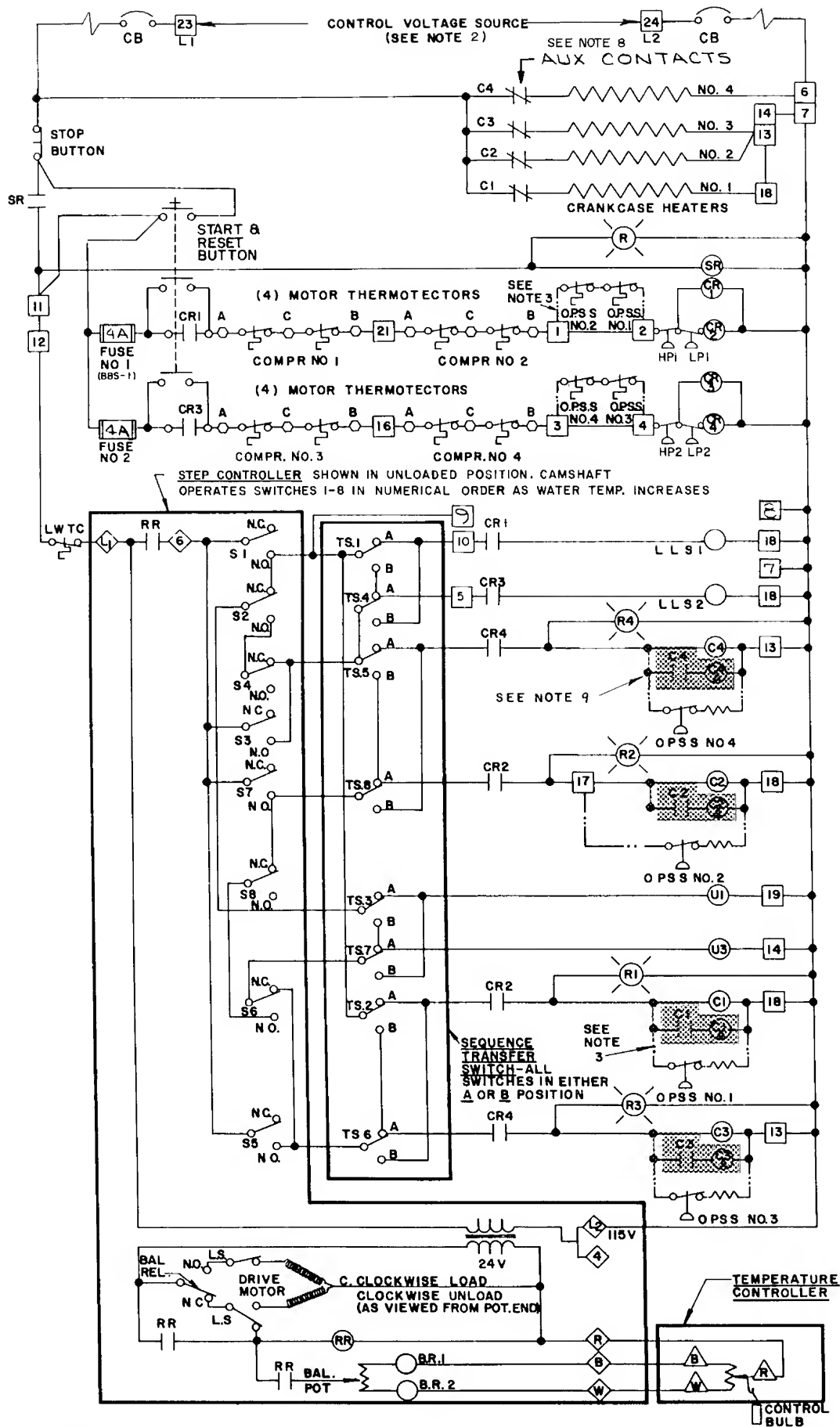
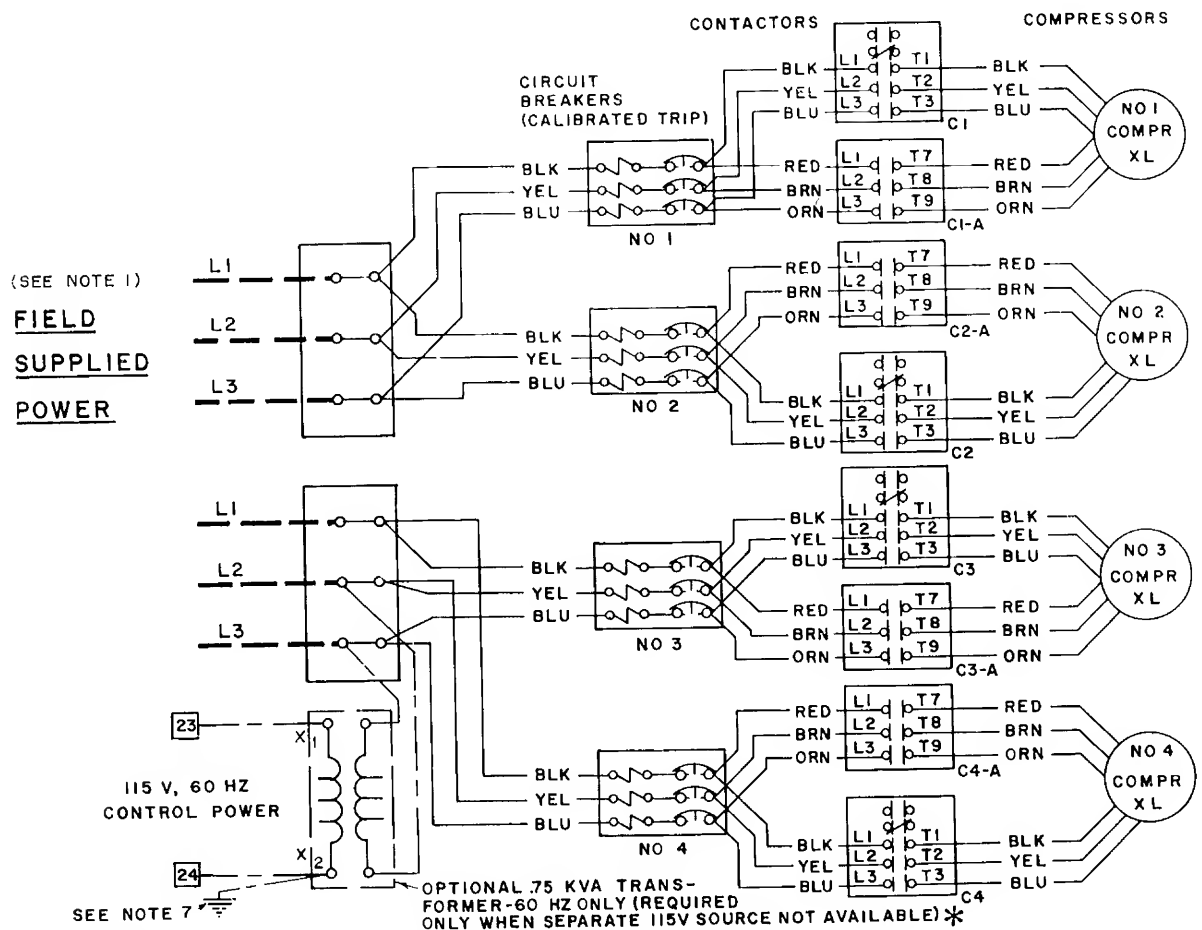
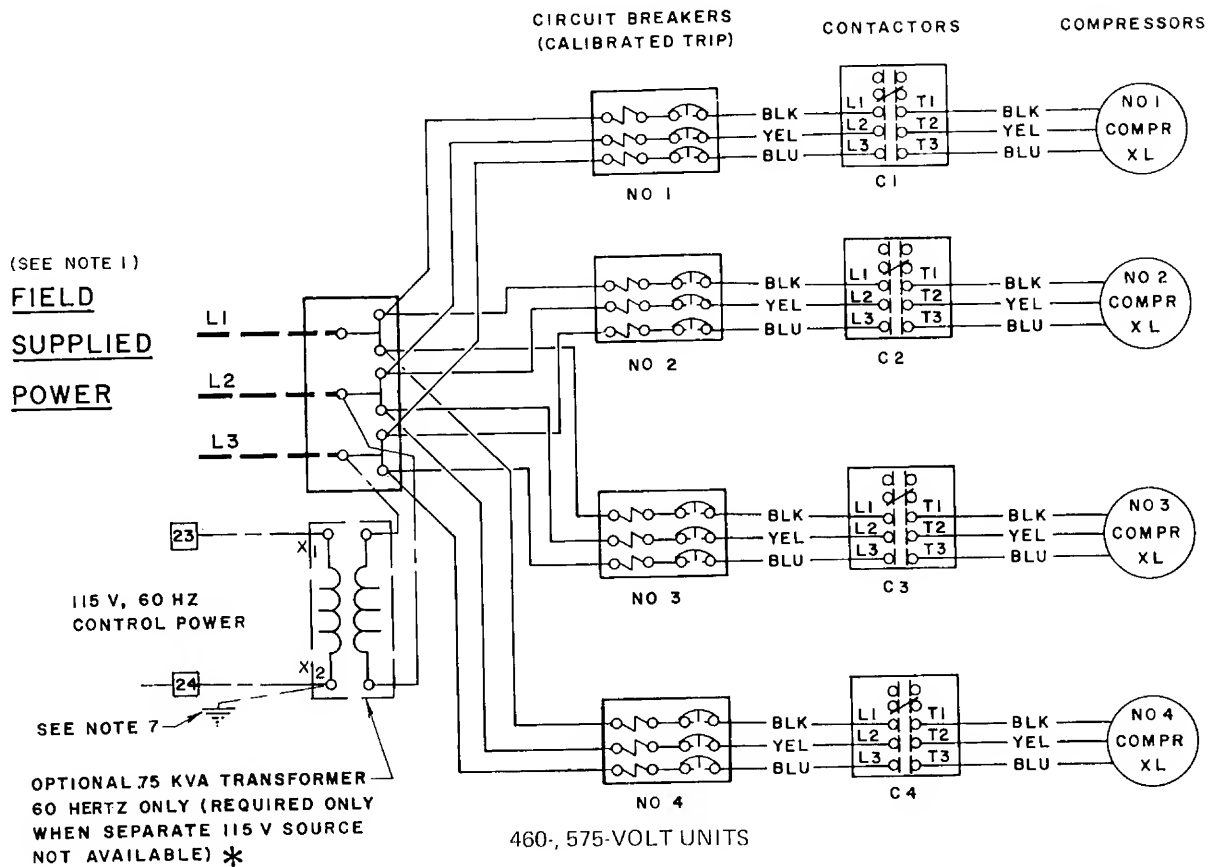


Fig. 6 – Control Circuit Schematic (All Voltages)

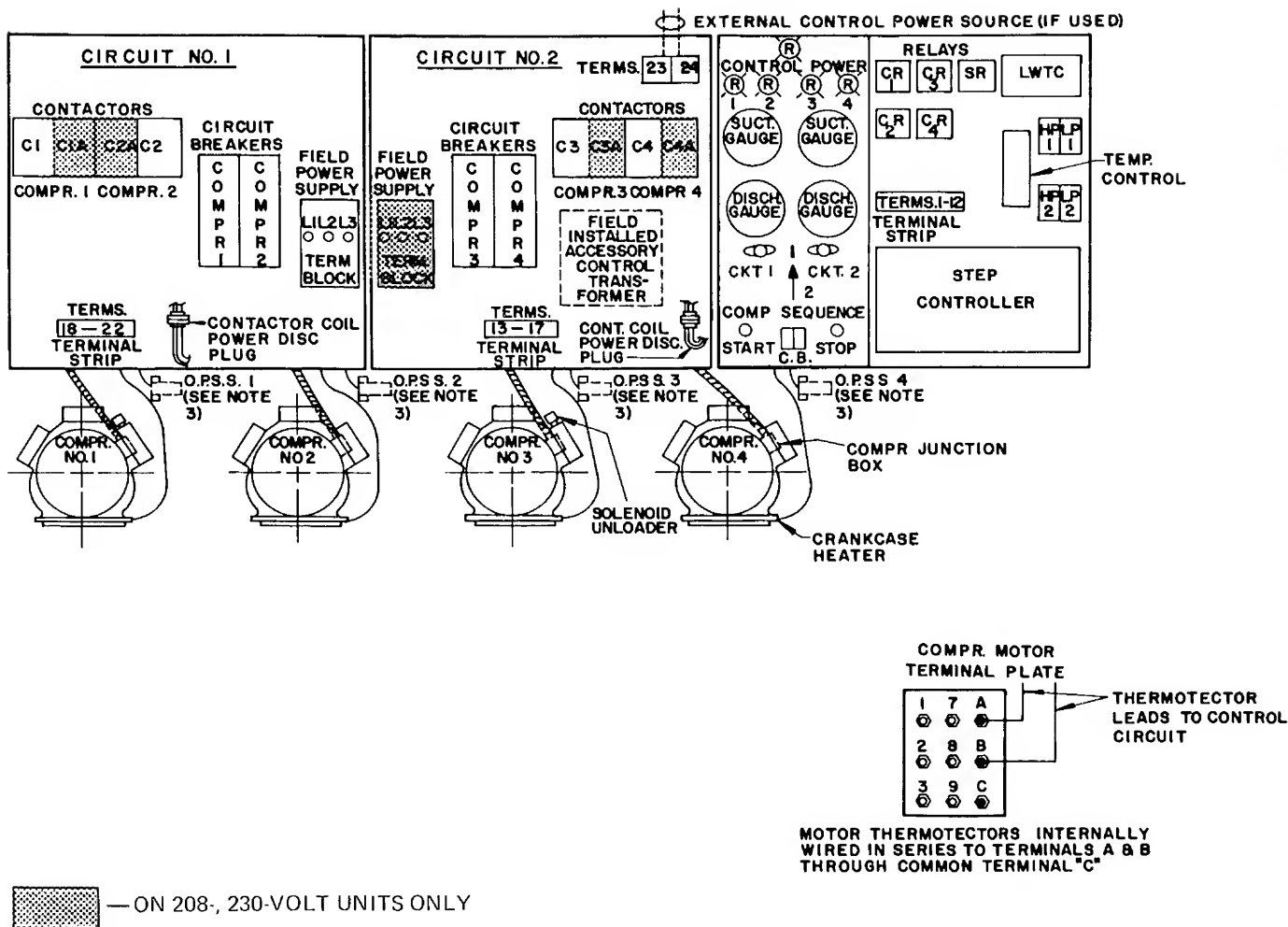


* TRANSFORMER WIRING INSTRUCTIONS FURNISHED WITH ACCESSORY PACKAGE

208-, 230- VOLT UNITS

30HR, HS100, 110, 120

Fig. 7 - Power Schematics (All Voltages)



30HR, HS100, 110, 120

Fig. 8 — Locations of Control Components (All Voltages)

For replacement items use Carrier Specified Parts.

Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.